

APPENDIX H. OTHER INVESTIGATIONS – BOEING

**North Boeing Field (NBF) Long-Term
Stormwater Treatment System (LTST) –
Excerpts for Samples Collected within Slip 4**



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JOB NO. 0025082.218.004

JOB NAME North Boeing Field 2017 FWAAC

SUBJECT Calendar Year 2017 FWAAC

CALC BY	MDV	DATE	6/5/2018
CHK BY	JAK	DATE	6/5/2018

LONG-TERM STORMWATER TREATMENT SYSTEM (LTST) - NORTH BOEING FIELD FLOW-WEIGHTED ANNUAL AVERAGE CONCENTRATION (FWAAC) FOR PCBs

Treated & Untreated¹ Stormwater

	<u>C (µg/L)⁷</u>	<u>V (L)</u>
1Q 2017 (1/17/2017)	0.0060	617,081,809
2Q 2017 (4/25/2017)	0.0025	299,748,883
3Q 2017 (9/17/2017)	0.0025	106,502,352
4Q 2017 (10/7/2017)	0.0025	416,915,703
Total Volume	1,440,248,746	

Concentrations are from quarterly flow-weighted composite sampling at the LS431 discharge point

Volumes are from the FloDar flow meter and are the total discharged from the LS431 discharge point

Treated Stormwater (LTST effluent)

<u>2017</u>	<u>C (µg/L)⁷</u>	<u>V (L)</u>	<u>C*V (µg)</u>
January ²	0.0040	110,121,646	435,158
February	0.0060	143,451,481	860,709
March	0.0025	134,949,238	337,373
April ²	0.0150	100,097,566	1,503,283
May	0.0025	71,748,495	179,371
June	0.0025	51,735,895	129,340
July	0.0025	34,197,814	85,495
August	0.0025	31,096,064	77,740
September ³	0.0025	35,373,139	88,433
October ³	0.0025	51,898,664	129,747
November	0.0025	95,201,294	238,003
December ⁴	0.0025	55,405,691	138,514
Total	915,276,987	4,203,166	

Concentrations are from monthly LTST effluent sampling

Volumes are from LTST system data, total treated & discharged (not recirculated) by the LTST system

Untreated Stormwater

	<u>C (µg/L)⁵</u>	<u>V (L)</u>	<u>C*V (µg)</u>
1Q 2017	0.0091	228,559,444	2,069,251
2Q 2017 ⁶	0.0025	76,166,927	190,417
3Q 2017	0.0025	5,835,335	14,588
4Q 2017	0.0025	214,410,055	536,025
Total	2,810,282		

Concentrations are back-calculated from discharge sampling results, see Note 5

The untreated stormwater volume equals the total discharge volume (LS431) minus the treated volume

(FWAAC calculation continued)

Total Volume Discharged (treated & untreated)

Year	V (L)	V (gallons)	Percent Treated
1/1/2017 - 12/31/2017	1,440,248,746	380,474,652	64%

2017 FWAAC = 0.005 (µg/L)

FWAAC IG = 0.018 (µg/L)

Goal met for 2017? Yes

- (1) Stormwater that exceeds the 1,500 gpm LTST system capacity can bypass the LTST system.
- (2) Two samples were taken in the month ("monthly" and "storm" events); the concentration used is a weighted concentration based on precipitation.
- (3) Two samples were taken in the month ("monthly and "storm" events); both results were ND.
- (4) No sample was taken in December due to improvements made to the LTST system; ND value used based on November data.
- (5) Untreated stormwater concentration is back-calculated using the known volumes/concentrations of the combined treated/untreated stormwater (LS431) and the treated stormwater (EFF).
- (6) Back-calculation results in a negative concentration due to a detection (0.015 µg/L) in the treated stormwater (EFF) in April; used the concentration of the quarterly LS431 discharge composite sample (ND) as the concentration in untreated stormwater for this quarter.
- (7) Where results were ND, the half of the detection limit (0.0025 µg/L) was used.

ND = non-detect

C = concentration

V = volume

µg = micrograms

L = liter

FWAAC = Flow-Weighted Annual Average Concentration of PCBs

IG = Interim Goal



LANDAU
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JOB NO. 0025082.219.004

JOB NAME North Boeing Field 2018 FWAAC

SUBJECT Calendar Year 2018 FWAAC

CALC BY	MDV	DATE	4/19/2019
CHK BY	JAK	DATE	4/19/2019

LONG-TERM STORMWATER TREATMENT SYSTEM (LTST) - NORTH BOEING FIELD FLOW-WEIGHTED ANNUAL AVERAGE CONCENTRATION (FWAAC) FOR PCBs

Discharged (Treated & Untreated) Stormwater

	<u>C (µg/L)¹</u>	<u>V (L)</u>
1Q 2018 (1/11/2018)	0.0025	412,438,332
2Q 2018 (4/10/2018)	0.0025	249,086,594
3Q 2018 (9/10/2018) ⁵	0.0025	91,945,239
4Q 2018 (10/23/2018)	0.0060	320,824,042
Total Volume		1,074,294,207

Concentrations are from quarterly flow-weighted composite sampling at the LS431 discharge point

Volumes are from the FloDar flow meter at the LS431 discharge point, unless otherwise noted.

Treated Stormwater (LTST effluent)

<u>2018</u>	<u>C (µg/L)¹</u>	<u>V (L)</u>	<u>C*V (µg)</u>
January ²	0.0025	136,012,688	340,032
February	0.0025	76,121,071	190,303
March	0.0025	72,996,563	182,491
April ²	0.0025	101,796,398	254,491
May	0.0025	50,311,949	125,780
June	0.0025	45,874,415	114,686
July ⁵	0.0025	28,949,517	72,374
August ⁵	0.0025	26,325,295	65,813
September ²	0.0025	34,101,926	85,255
October ²	0.0025	44,708,327	111,771
November	0.0025	62,082,825	155,207
December	0.0025	89,461,109	223,653
Total		768,742,083	1,921,855

Concentrations are from monthly LTST effluent sampling

Volumes are from LTST system data, total treated & discharged (not recirculated) by the LTST system

Untreated Stormwater

	<u>C (µg/L)³</u>	<u>V (L)</u>	<u>C*V (µg)</u>
1Q 2018	0.0025	127,308,009	318,270
2Q 2018	0.0025	51,103,833	127,760
3Q 2018 ⁴	0.0025	2,568,501	6,421
4Q 2018	0.0115	124,571,781	1,434,314
Total		1,886,764	

Concentrations are calculated from discharge sampling results, see Note 3

The untreated stormwater volume equals the total discharge volume (LS431) minus the treated volume

(FWAAC calculation continued)

Total Volume Discharged (treated & untreated)

Year	V (L)	V (gallons)	Percent Treated
1/1/2018 - 12/31/2018	1,074,294,207	283,799,389	72%

2018 FWAAC = 0.004 (µg/L)

FWAAC IG = 0.018 (µg/L)

Goal met for 2018? Yes

(1) Where results were ND, the half of the detection limit (0.0025 µg/L) was used.

(2) Two samples were taken in the month ("monthly and "storm" events); both results were ND.

(3) Untreated stormwater concentration is calculated using the known volumes/concentrations of the combined treated/untreated stormwater (LS431) and the treated stormwater (EFF).

(4) Bypass volume estimated from Flo-Dar flow meter readings that exceed the treatment system nominal capacity of 1,500 gpm.

(5) Given low flow and limited bypass during this period, volumes determined from treatment system flow meter data rather than FlowDar discharge flow meter data.

ND = non-detect

C = concentration

V = volume

µg = micrograms

L = liter

FWAAC = Flow-Weighted Annual Average Concentration of PCBs

IG = Interim Goal

**Additional Duwamish Sediment Other Area
(DSOA) Backfill Sampling Data Report –
Excerpts for Samples Collected within Slip 4**



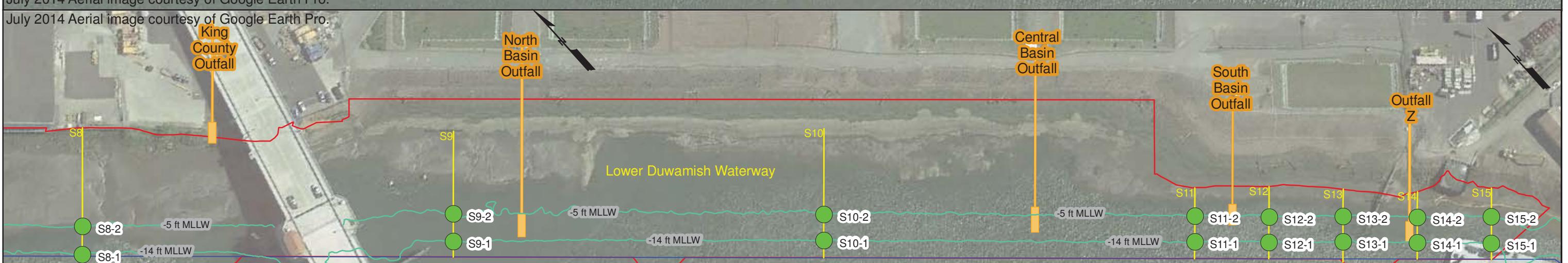
Additional Duwamish Sediment Other Area Backfill Sampling Data Report

Duwamish Sediment Other Area and Southwest Bank Corrective
Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington
Project # LY15160330 The Boeing Company

Prepared for:

The Boeing Company
Seattle, Washington

2/7/2019



Legend

Post-Construction Contours

Navigation Channel

Sample Locations

Section Lines

DSOA

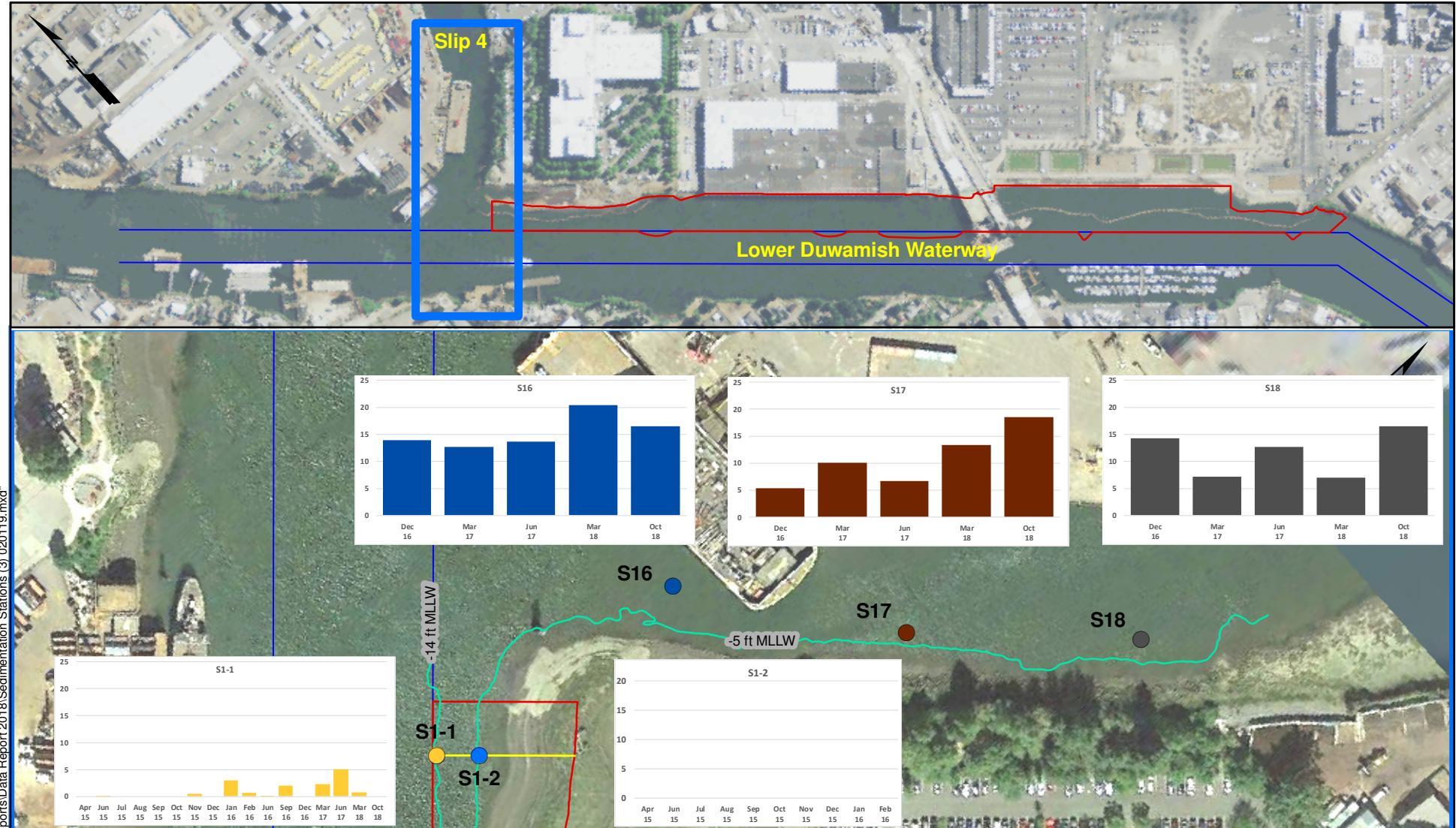
Notes:
Labels next to the proposed sample locations
include the Station IDs and consist of the Section
Line and the sample position (e.g., S6-2).

SAMPLING LOCATIONS
Additional Duwamish Sediment Other Area
Backfill Sampling
Boeing Plant 2
Seattle/Tukwila, Washington

By: RHG Date: 7/19/2017 Project No. LY15160330



Figure 1



Legend

- Post-Construction Contours
- Sample Locations
- DSOA
- Navigation Channel

Notes:

Labels next to the proposed sample locations include the Station IDs and consist of the Section Line and the sample position (e.g., S6-2).

Depositional layer thickness presented on the graphs is an average thickness measured in centimeters (cm).

**DEPOSITIONAL LAYER THICKNESS
BY LOCATION AND MONTH**
Additional Duwamish Sediment Other Area
Backfill Sampling
Boeing Plant 2
Seattle/Tukwila, Washington

By: RHG	Date: 2/1/2019	Project No. LY15160330
Figure 2c		

TABLE 1**SAMPLING LOCATIONS**

Additional Duwamish Sediment Other Area Backfill Sampling
 Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project
 Boeing Plant 2

Location	June 2017 Sampling					March 2018 Sampling				
	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Surficial Silt Sample	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Surficial Silt Sample
			Easting	Northing				Easting	Northing	
SD-DMS1-1	6/8/2017	8:13	1272932	198213	SD-DMS1-1-0617-A	3/21/2018	13:54	1272924	198212	
SD-DMS2-1	6/8/2017	8:31	1273008	198139	SD-DMS2-1-0617-A	3/21/2018	14:03	1273010	198140	SD-DMS2-1-0318-A
SD-DMS3-1	6/8/2017	8:45	1273083	198076	SD-DMS3-1-0617-A	3/21/2018	14:17	1273077	198077	SD-DMS3-1-0318-A
SD-DMS4-1	6/8/2017	9:00	1273160	198010		3/21/2018	14:32	1273149	198004	SD-DMS4-1-0318-A
SD-DMS5-1	6/8/2017	9:09	1273229	197931	SD-DMS5-1-0617-A	3/21/2018	14:55	1273228	197936	SD-DMS5-1-0318-A
SD-DMS6-1	6/8/2017	9:23	1273601	197601	SD-DMS6-1-0617-A	3/21/2018	15:11	1273592	197610	SD-DMS6-1-0318-A
SD-DMS7-1	6/8/2017	9:35	1273967	197263	SD-DMS7-1-0617-A	3/21/2018	11:25	1273965	197270	SD-DMS7-1-0318-A
SD-DMS8-1	6/8/2017	9:50	1274334	196933	SD-DMS8-1-0617-A	3/21/2018	11:09	1274328	196934	SD-DMS8-1-0318-A
SD-DMS9-1	6/8/2017	10:05	1274716	196617		3/21/2018	10:54	1274717	196613	
SD-DMS10-1	6/8/2017	10:16	1275088	196278		3/21/2018	10:42	1275093	196273	
SD-DMS11-1	6/8/2017	11:29	1275458	195935	SD-DMS11-1-0617-A	3/21/2018	10:33	1275467	195942	
SD-DMS12-1	6/8/2017	11:41	1275534	195862		3/21/2018	9:39	1275533	195876	
SD-DMS13-1	6/8/2017	11:52	1275613	195800	SD-DMS13-1-0617-A	3/21/2018	9:20	1275611	195810	SD-DMS13-1-0318-A
SD-DMS14-1	6/8/2017	12:06	1275690	195741	SD-DMS14-1-0617-A	3/21/2018	9:03	1275687	195735	SD-DMS14-1-0318-A
SD-DMS15-1	6/8/2017	12:20	1275736	195695	SD-DMS15-1-0617-A	3/21/2018	8:43	1275734	195701	SD-DMS15-1-0318-A
SD-DMS16 ³	6/8/2017	12:41	1272939	198486	SD-DMS16-0617-A	3/21/2018	13:15	1272944	198491	SD-DMS16-0318-A
SD-DMS17 ³	6/8/2017	13:02	1273118	198622	SD-DMS17-0617-A	3/21/2018	12:59	1273119	198629	SD-DMS17-0318-A
SD-DMS18 ³	6/8/2017	13:16	1273266	198776	SD-DMS18-0617-A	3/21/2018	12:44	1273278	198781	SD-DMS18-0318-A

TABLE 1**SAMPLING LOCATIONS**

Additional Duwamish Sediment Other Area Backfill Sampling
 Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project
 Boeing Plant 2

Location	October 2018 Sampling				
	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Surficial Silt Sample
			Easting	Northing	Sample ID ^{1,2}
SD-DMS1-1	10/25/2018	15:56	1272936	198202	
SD-DMS2-1	10/25/2018	15:25	1273010	198141	SD-DMS2-1-1018-A
SD-DMS3-1	10/25/2018	13:52	1273084	198069	SD-DMS3-1-1018-A
SD-DMS4-1	10/25/2018	13:30	1273159	198004	SD-DMS4-1-1018-A
SD-DMS5-1	10/25/2018	13:15	1273225	197938	SD-DMS5-1-1018-A
SD-DMS6-1	10/25/2018	13:01	1273598	197601	SD-DMS6-1-1018-A
SD-DMS7-1	10/25/2018	12:47	1273967	197272	SD-DMS7-1-1018-A
SD-DMS8-1	10/25/2018	11:51	1274334	196924	SD-DMS8-1-1018-A
SD-DMS9-1	10/25/2018	11:38	1274714	196606	SD-DMS9-1-1018-A
SD-DMS10-1	10/25/2018	10:53	1275092	196375	
SD-DMS11-1	10/25/2018	10:37	1275469	195943	SD-DMS11-1-1018-A
SD-DMS12-1	10/25/2018	10:21	1275537	195874	SD-DMS12-1-1018-A
SD-DMS13-1	10/25/2018	10:06	1275609	195811	SD-DMS13-1-1018-A
SD-DMS14-1	10/25/2018	9:46	1275683	195733	SD-DMS14-1-1018-A
SD-DMS15-1	10/25/2018	9:12	1275726	195694	SD-DMS15-1-1018-A
SD-DMS16 ³	10/25/2018	15:08	1272945	198482	SD-DMS16-1018-A
SD-DMS17 ³	10/25/2018	14:49	1273124	198621	SD-DMS17-1018-A
SD-DMS18 ³	10/25/2018	14:26	1273271	198785	SD-DMS18-1018-A

Note(s)

1. (MMYY) = 4-digit sampling month/year suffix added to sample ID (e.g., 0415 is April 2015 sampling event).
2. Samples representing surficial silt accumulations were collected starting in June 2016.
3. Three stations in Slip 4 were added in December 2016.

Abbreviation(s)

- cm = centimeter(s)
 NAD = North American Datum
 WA SPC = Washington State Plan Coordinates

TABLE 2**MEASUREMENTS OF AVERAGE SILT THICKNESS¹**

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Station	Label	June-16	September-16	December-16	March-17	June-17	March-18	October-18
Offshore Stations (approximate elevation -14 feet MLLW)								
S1-1	Downstream	0.1	2.0	0.0	2.3	5.0	0.8	0.0
S2-1		2.8	0.8	8.0	9.0	7.3	5.7	9.5
S3-1		8.2	11.3	5.0	2.3	13.3	13.0	14.0
S4-1		7.3	6.7	1.5	11.7	0.2	15.0	15.5
S5-1		14.3	5.3	0.0	0.7	15.0	14.7	10.0
S6-1		3.8	11.7	13.0	13.8	8.7	16.0	16.8
S7-1		15.3	12.7	13.3	15.0	15.3	21.3	13.3
S8-1		12.5	13.7	11.5	15.3	15.0	23.7	9.8
Average Thickness		8.0	8.0	6.5	8.8	10.0	13.8	11.1
South Park Bridge								
S9-1		0.0	0.3	0.0	1.3	1.0	0.5	4.0
S10-1		0.0	0.8	0.0	0.0	0.0	0.5	3.0
S11-1		0.1	0.8	3.3	4.8	3.2	0.0	9.8
S12-1		0.1	1.2	2.0	2.2	1.5	1.7	8.7
S13-1		0.0	1.7	3.3	4.5	8.7	11.3	4.3
S14-1		10.2	8.7	14.7	12.3	10.7	18.0	14.8
S15-1	Upstream	12.7	13.3	14.0	17.0	15.3	24.7	16.2
Average Thickness		3.3	3.8	5.3	6.0	5.8	8.1	8.7
Station	Label	December-16	March-17	June-17	March-18	October-18		
Stations in Slip 4 Dredge and Backfill Area								
S16	Mouth	14.0	12.7	13.7	20.3	16.5		
S17		5.3	10.0	6.7	13.3	18.5		
S18	Head	14.3	7.2	12.7	7.0	16.5		
Average Thickness		11.2	9.9	11.0	13.6	17.2		

Note(s)

1. Average of three measurements in each grab sample in centimeters.
- = No backfill material present in the bottom of the grab sampler.
 Total thickness of silt layer likely underestimated.

Abbreviation(s)

MLLW = mean lower low water

TABLE 3

GRAIN-SIZE ANALYSIS RESULTS^{1,2}

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Monitoring Event	June-17			June-17			March-18			March-18			March-18		
Collection Date	6/8/2017			6/8/2017			3/21/2018			3/21/2018			3/21/2018		
Sample Depth (ft)	0-15.3 cm			0-12.7 cm			0-13 cm			0-21.3 cm			0-23.7 cm		
Sample ID	SD-DMS15-1-0617-A			SD-DMS18-0617-A			SD-DMS3-1-0318-A			SD-DMS7-1-0318-A			SD-DMS8-1-0318-A		
Analyte	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Grain Size (%)															
Gravel	0.2		J	1.5		J	3.4		J	0		J	0.1		J
Very Coarse Sand	1.8		J	1.5		J	2.7			1.6			1.8		
Coarse Sand	1.2			2.5			5.9			1.6			2		
Medium Sand	1			1.7			8.9			1.8			2.5		
Fine Sand	0.8			0.7			6.8			5.5			3.2		
Very Fine Sand	5.6			1.3			14.4			15			8.6		
Coarse Silt	13			6.4			12.5			18			13.1		
Medium Silt	27.9			32.1			15.5			19.8			23		
Fine Silt	22.1			28.1			10.2			17.4			19.1		
Very Fine Silt	10			8.1			7.2			6.3			9.7		
8-9 Phi Clay	5.5			5.5			4.8			4.7			6.1		
9-10 Phi Clay	3.8			3.5			2.8			2.4			3.6		
> 10 Phi Clay	7.1			7.3			5			5.9			7.2		
Total Fines	89.4			90.8			58			74.5			81.8		

TABLE 3

GRAIN-SIZE ANALYSIS RESULTS^{1,2}

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Monitoring Event	March-18			March-18			March-18			October-18			October-18		
Collection Date	3/21/2018			3/21/2018			3/21/2018			10/25/2018			10/25/2018		
Sample Depth (ft)	0-18 cm			0-24.7 cm			0-7 cm			0-14 cm			0-13.3 cm		
Sample ID	SD-DMS14-1-0318-A			SD-DMS15-1-0318-A			SD-DMS18-0318-A			SD-DMS3-1-1018-A			SD-DMS7-1-1018-A		
Analyte	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Grain Size (%)															
Gravel	0.8		J	0.3		J	3.5		J	1.4		J	0.1		J
Very Coarse Sand	2.7			2.2			3.6			1.7		J	1.5		J
Coarse Sand	2.4			1.8			3.2			4.2			2.3		
Medium Sand	2.1			1.9			2.0			8.1			4.1		
Fine Sand	1.8			2.3			0.7			8.2			7.9		
Very Fine Sand	5.5			7.2			1.6			22.2			24.6		
Coarse Silt	12.1			17.2			6.2			8.4			11.7		
Medium Silt	25.8			21.5			23.1			14.2			15.4		
Fine Silt	21.8			20.9			27.7			10.9			11.8		
Very Fine Silt	9.6			9.3			15.2			6.7			6.3		
8-9 Phi Clay	5.4			5.4			3.4			3.8			3.7		
9-10 Phi Clay	3.1			3.1			3.5			3.8			4.1		
> 10 Phi Clay	6.8			6.8			6.4			6.4			6.5		
Total Fines	84.6			84.2			85.5			54.2			59.5		

TABLE 3

GRAIN-SIZE ANALYSIS RESULTS^{1,2}

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Monitoring Event	October-18			October-18			October-18			October-18		
Collection Date	10/25/2018			10/25/2018			10/25/2018			10/25/2018		
Sample Depth (ft)	0-9.8 cm			0-14.8 cm			0-16.2 cm			0-16.5 cm		
Sample ID	SD-DMS8-1-1018-A			SD-DMS14-1-1018-A			SD-DMS15-1-1018-A			SD-DMS18-1018-A		
Analyte	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2
Grain Size (%)												
Gravel	0.8	J		0.7	J		0.3	J		0.7		J
Very Coarse Sand	1.9	J		1.9	J		1.7	J		2.8		J
Coarse Sand	3			1.7			1.9			3.2		
Medium Sand	3.8			2.0			2.7			2.6		
Fine Sand	4.9			2.6			3.2			1.4		
Very Fine Sand	15.3			8.0			9.7			3.2		
Coarse Silt	12.2			9.9			11			6.5		
Medium Silt	20.4			26.0			24.1			25.2		
Fine Silt	13.3			21.0			19.8			25.0		
Very Fine Silt	7.6			8.8			7.9			10.9		
8-9 Phi Clay	4.5			4.7			4.7			4.4		
9-10 Phi Clay	4.5			4.6			4.6			5.3		
> 10 Phi Clay	7.8			8.3			8.4			8.8		
Total Fines	70.3			83.3			80.5			86.2		

Note(s)

1. No laboratory data flags (Q1) assigned.
2. Data validation qualifiers (Q2) are as follows:
 J = The associated numerical value is an estimated value.

Abbreviation(s)

cm = centimeter(s)
 ft = feet

TABLE 4

PCB ANALYSIS RESULTS^{1,2}

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Station	Year	Month	Sample ID	Total Organic Carbon		Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Total PCBs		Total PCBs									
				Percent (%)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(mg/kg-OC)	Q1	Q2				
S3-1	2016	June	SD-DMS3-1-0616-A	2.28	J		4 U			4 U			4 U			28			33			21			82			3.6	J		
S5-1		June	SD-DMS5-1-0616-A	2.25	J		3.9 U			3.9 U			3.9 U			22			34			20			76			3.4	J		
S7-1		June	SD-DMS7-1-0616-A	2.19	J		3.9 U			3.9 U			3.9 U			21			33			20			74			3.4	J		
S8-1		June	SD-DMS8-1-0616-A	2.18	J		4 U			4 U			4 U			25			48			32			105			4.8	J		
S14-1		June	SD-DMS14-1-0616-A	2.35	J		4 U			4 U			4 U			32			62			40			134			5.7	J		
S15-1		June	SD-DMS15-1-0616-A	1.95	J		3.9 U			3.9 U			3.9 U			27			49			27			103			5.3	J		
			Monthly Average (n=6)	2.20			—			—			—			26			43			27			96			4.4			
S3-1	2016	September	SD-DMS3-1-0916-A	1.5			1.5 U			1.5 U			1.5 U			22			42			40 P1	J		104	J		6.9	J		
S6-1		September	SD-DMS6-1-0916-A	1.63			1.5 U			1.5 U			1.5 U			17			27			24 P1	J		68	J		4.2	J		
S7-1		September	SD-DMS7-1-0916-A	1.76			1.5 U			1.5 U			1.5 U			22			29			27 P1	J		78	J		4.4	J		
S8-1		September	SD-DMS8-1-0916-A	2.39			1.5 U			1.5 U			1.5 U			19			30			29 P1	J		78	J		3.3	J		
S14-1		September	SD-DMS14-1-0916-A	1.99			1.5 U			1.5 U			1.5 U			27			74			47 P1	J		149	J		7.5	J		
S15-1		September	SD-DMS15-1-0916-A	2.44			1.5 U			1.5 U			1.5 U			31			56			57			144			5.9			
			Monthly Average (n=6)	1.95			—			—			—			—			23			43			37			103			5.4
S3-1	2016	December	SD-DMS3-1-1216-A	1.68	J		1.5 U			1.5 U			1.5 U			20			34			22	J		75	J		4.5	J		
S6-1		December	SD-DMS6-1-1216-A	1.71	J		1.5 U			1.5 U			1.5 U			22	P1	J	29			19			70	J		4.1	J		
S7-1		December	SD-DMS7-1-1216-A	2.56	J		1.5 U			1.5 U			1.5 U			25			43			28			95			3.7	J		
S8-1		December	SD-DMS8-1-1216-A	2.46	J		1.5 U			1.5 U			1.5 U			30			49			31			110			4.5	J		
S14-1		December	SD-DMS14-1-1216-A	2.97	J		1.5 U			1.5 U			1.5 U			31			49			30			110			3.7	J		
S15-1		December	SD-DMS15-1-1216-A	3.41	J		1.5 U			1.5 U			1.5 U			28			50			29			108			3.2	J		
S16		December	SD-DMS16-1216-A	2.97	J		1.5 U			1.5 U			1.5 U			37			59			37			133			4.5	J		
S18		December	SD-DMS18-1216-A	3.09	J		1.5 U			1.5 U			1.5 U			35			63			43			141			4.6	J		
			Monthly Average (n=6)	2.61			—			—			—			—			26			42			27			95			4
S3-1	2017	March	SD-DMS3-1-0317-A	1.45	J		1.5 U			1.5 U			1.5 U			19			35			22			76			5.3			
S4-1		March	SD-DMS4-1-0317-A	2.31	J		1.5 U			1.5 U			1.5 U			21			41			32			93			4.0			
S7-1		March	SD-DMS7-1-0317-A	1.99	J		1.6 U			1.6 U			1.6 U			23			41			34			98			4.9			
S8-1		March	SD-DMS8-1-0317-A	2.06	J		1.5 U			1.5 U			1.5 U			20			36			31			87			4.2			
S14-1		March	SD-DMS14-1-0317-A	2.78	J		1.6 U			1.6 U			1.6 U			23			53			30			106			3.8			
S15-1		March	SD-DMS15-1-0317-A	4.01	J		1.5 U			1.5 U			1.5 U			30			56			44			130			NA			
			Monthly Average (n=6)	2.43			—			—			—			—			23			44			32			98			4.4
S3-1	2017	June	SD-DMS3-1-0617-A	2.61	J		3.9 U			3.9 U			3.9 U			18			29			23			70			2.7	J		
S5-1		June	SD-DMS5-1-0617-A	1.69	J		4 U			4 U			4 U			24			37			32			93			5.5	J		
S7-1		June	SD-DMS7-1-0617-A	2.63	J		4 U			4 U			4 U			29			45 P1	J		41			114	J		4.3	J		
S8-1		June	SD-DMS8-1-0617-A	3.02	J		3.9 U			3.9 U			3.9 U			30			46			41			117			3.9	J		
S14-1</td																															

TABLE 4

PCB ANALYSIS RESULTS^{1,2}

Additional Duwamish Sediment Other Area Backfill Sampling
 Boeing Plant 2
 Seattle/Tukwila, Washington

Station	Year	Month	Sample ID	Total Organic Carbon		Aroclor 1016		Aroclor 1221		Aroclor 1232		Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1260		Total PCBs		Total PCBs										
				Percent (%)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(µg/kg DW)	Q1	Q2	(mg/kg-OC)	Q1	Q2								
			Monthly Average (n=5)	2.41			—			—			—			35			54			33			122			5.6				
S3-1	2018	October	SD-DMS3-1-1018-A	1.48	J		3.9	U		3.9	U		3.9	U		3.9	U		26			36			40	P1	J	102	J	6.9	J	
S7-1		October	SD-DMS7-1-1018-A	2.21	J		3.9	U		3.9	U		3.9	U		3.9	U		32			47			24	P1	J	103	J	4.7	J	
S8-1		October	SD-DMS8-1-1018-A	2.53	J		3.9	U		3.9	U		3.9	U		3.9	U		41			60			37			138		5.5	J	
S14-1		October	SD-DMS14-1-1018-A	2.58	J		3.9	U		3.9	U		3.9	U		3.9	U		29			40			22	P1	J	92	J	3.5	J	
S15-1		October	SD-DMS15-1-1018-A	3.04	J		4	U		4	U		4	U		4	U		34			43			25	P1	J	101	J	3.3	J	
S18		October	SD-DMS18-1018-A	2.87	J		4	U		4	U		4	U		4	U		42			57			35	P1	J	134	J	4.7	J	
			Monthly Average (n=5)	2.45			—			—			—			—			32			45			30			107			4.8	

Note(s)

1. Laboratory data qualifiers (Q1) are as follows:

U = analyte not detected at the reporting limit provided.

J = estimated concentration when the value is less than the reporting limit (RL).

P = Analyte detected on both columns but relative percent difference (RPD) >40% with no obvious chromatographic interference.

Y = Analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

2. Data validation qualifiers (Q2) are as follows:

UJ = The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

UY = The material was analyzed for, but was not detected. The reporting limit was elevated due to chromatographic interference.

J = The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.

JN = The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification. The associated numerical value is the approximate concentration of the analyte in the sample.

3. Sample representative of silt layer at Station S13-1 incorrectly assigned sample ID SD-DMS13-2-0715-A.

Abbreviation(s)

DW = dry weight

mg/kg-OC = milligram(s) per kilogram organic carbon

n = number

NA = Not available; total organic carbon < 0.5 % or > than 4 %

PCB = polychlorinated biphenyl

µg/kg DW = microgram(s) per kilogram dry-weight

Slip 4 samples; not included in total PCB monthly average

**Post-Construction Surface Sediment
Monitoring Report (Year 3)–
Excerpts for Samples Collected within Slip 4**



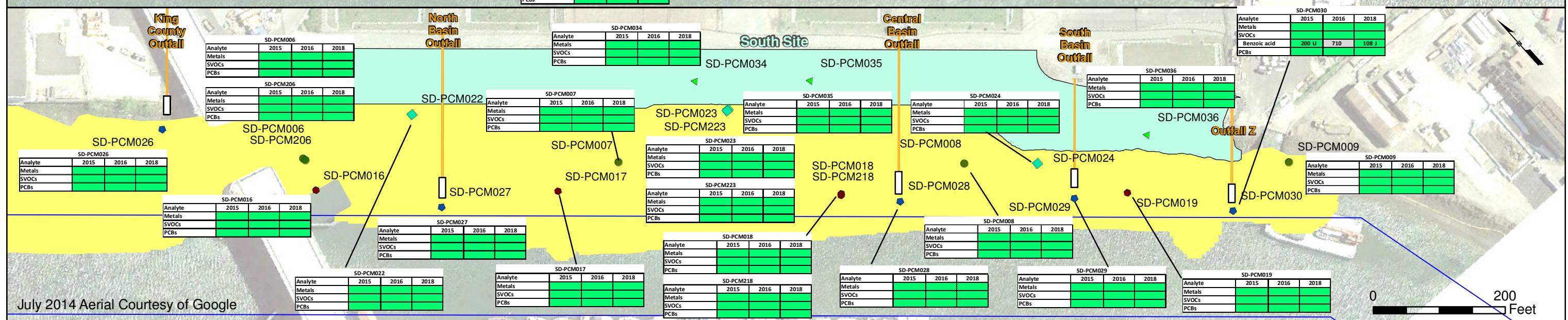
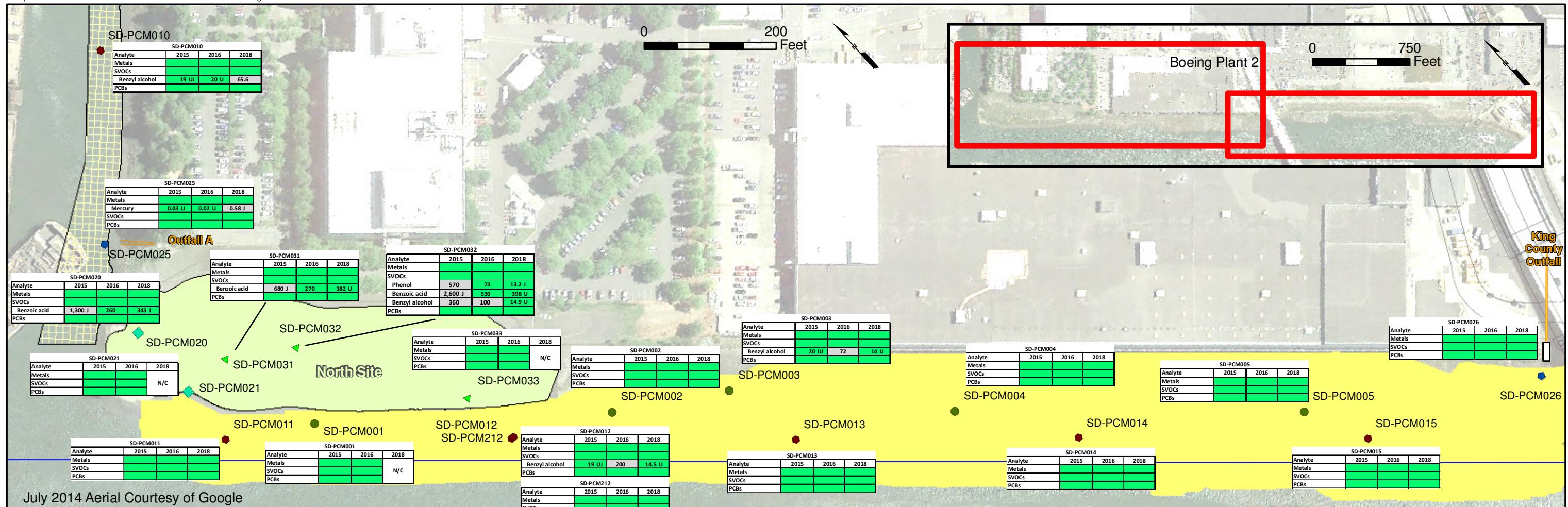
Post-Construction Surface Sediment Monitoring Report—Year 3

Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2, Seattle/Tukwila, Washington

Prepared for:

The Boeing Company

Seattle, Washington



- Shoreline Area Samples (at approximately +7 ft MLLW)
- Shoreline Area Samples (at approximately +4 ft MLLW)
- Sampling Locations (above -5 ft MLLW and below + 4 ft MLLW)
- Sampling Location (below -5 ft MLLW)
- Outfall Sample Locations

North Site

South Site

Slip 4 Approximate Dredge Area

DSOA Limits of Dredging

Sampling Location

SD-PCM30

SMS	2015	2016	2018
Metals			
SVOCs			

SMS Analyte That
Exceeds SMS Criteria
Highlighted in Gray

Notes:
Sediment concentrations for Sediment Management Standards (SMS) chemicals of concern (COC) are compared to the SMS dry weight equivalent sediment criteria (Sediment Quality Standard [SQS] and Cleanup Screening Level [CSL] criteria). If all of the SMS COCs within a group are below the SQS then the cell is colored green. If one or more analytes exceed the SQS (or CSL) then the analyte is listed with the results from each year and the cells are color coded gray to indicate the value exceeds one or more of the SMS criterion.

POST-CONSTRUCTION SURFACE MONITORING
SAMPLING RESULTS 2015, 2016, AND 2018
Duwamish Sediment Other Area and Southwest
Bank Corrective Measure and Habitat Project,
Boeing Plant 2, Seattle/Tukwila, Washington

By: RHG Date: 8/27/2018 Project No. 0131320440

Figure 1



TABLE 1

POST-CONSTRUCTION SURFACE SAMPLE LOCATIONS AND AVERAGE SILT THICKNESS, YEAR 3
 Post-Construction Surface Sediment Monitoring—Year 3
 Duwamish Sediment Other Area and Southwest Bank
 Corrective Measure and Habitat Project
 Boeing Plant 2
 Seattle/Tukwila, Washington

Location	Sample ID	Date Sampled	WA State Plane, North Zone, NAD 83, Survey Feet		Average Silt Thickness (cm)
			Easting	Northing	
In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW					
SD-PCM001	no sample	3/19/2018	1273107	198116	NC - Large gravel
SD-PCM002	SD-PCM00218	3/19/2018	1273451	197824	0.5
SD-PCM003	SD-PCM00318	3/19/2018	1273605	197736	1.0
SD-PCM004	SD-PCM00418	3/19/2018	1273839	197477	1.3
SD-PCM005	SD-PCM00518	3/19/2018	1274231	197126	0.0
SD-PCM006	SD-PCM00618	3/20/2018	1274655	196750	1.2
SD-PCM206 ¹	SD-PCM20618	3/20/2018	1274658	196749	1.3
SD-PCM007	SD-PCM00718	3/20/2018	1275016	196425	1.3
SD-PCM008	SD-PCM00818	3/20/2018	1275402	196073	0.0
SD-PCM009	SD-PCM00918	3/20/2018	1275765	195744	11.7
In-water Dredging Area Samples Below -5 feet MLLW					
SD-PCM010	SD-PCM01018	3/19/2018	1273240	198752	10.0
SD-PCM011	SD-PCM01118	3/19/2018	1272984	198191	1.3
SD-PCM012	SD-PCM01218	3/19/2018	1273311	197899	1.2
SD-PCM212 ¹	SD-PCM21218	3/19/2018	1273310	197898	1.8
SD-PCM013	SD-PCM01318	3/19/2018	1273630	197612	0.0
SD-PCM014	SD-PCM01418	3/19/2018	1273951	197322	0.0
SD-PCM015	SD-PCM01518	3/19/2018	1274274	197029	0.0
SD-PCM016	SD-PCM01618	3/19/2018	1274637	196700	0.3
SD-PCM017	SD-PCM01718	3/20/2018	1274913	196456	1.2
SD-PCM018	SD-PCM01818	3/20/2018	1275231	196168	6.3
SD-PCM218 ¹	SD-PCM21818	3/20/2018	1275232	196163	0.0
SD-PCM019	SD-PCM01918	3/20/2018	1275556	195873	1.5
Shoreline Area Samples at Approximately +4 feet MLLW					
SD-PCM020	SD-PCM02018	3/20/2018	1272995	198397	9.3
SD-PCM021	no sample	3/20/2018	1272995	198283	NC - Large gravel
SD-PCM022	SD-PCM02218	3/19/2018	1274832	196689	0.0
SD-PCM023	SD-PCM02318	3/19/2018	1275190	196369	0.0
SD-PCM223 ¹	SD-PCM22318	3/19/2018	1275194	196370	0.0
SD-PCM024	SD-PCM02418	3/20/2018	1275483	196003	0.0
Outfall Samples					
SD-PCM025	SD-PCM02518	3/19/2018	1273048	198535	2.5
SD-PCM026	SD-PCM02618	3/19/2018	1274536	196924	0.0
SD-PCM027	SD-PCM02718	3/20/2018	1274766	196555	1.5
SD-PCM028	SD-PCM02818	3/20/2018	1275291	196092	16.0
SD-PCM029	SD-PCM02918	3/20/2018	1275487	195921	3.2
SD-PCM030	SD-PCM03018	3/20/2018	1275653	195751	12.7

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS^{1,2}

Post-Construction Surface Sediment Monitoring—Year 3
 Duwamish Sediment Other Area and Southwest Bank
 Corrective Measure and Habitat Project
 Boeing Plant 2
 Seattle/Tukwila, Washington

Sampling Area	In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW												In-water Dredging Area Samples Below -5 feet MLLW																	
	SD-PCM008						SD-PCM009						SD-PCM010						SD-PCM011											
Location	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)						
Monitoring Year	2/24/2015		3/10/2016		3/20/2018		2/25/2015		3/11/2016		3/20/2018		3/11/2015		3/9/2016		3/19/2018		3/10/2015		3/9/2016		3/19/2018							
Collection Date	0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33							
Sample Depth (ft)	SD-PCM00815		SD-PCM00816		SD-PCM00818		SP-PCM00915		SD-PCM00916		SD-PCM00918		SD-PCM01015		SD-PCM01016		SD-PCM01018		SD-PCM01115		SD-PCM01116		SD-PCM01118							
Analyte	SMS SQS Criteria ³	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2														
Conventionals																														
Total Organic Carbon(percent)	—	0.04		0.059	J	0.12	J	0.051		0.334	J	2.2	J	0.097		1.95	J	2.75	J	0.165		0.59	J	0.71	J					
Metals (mg/kg)																														
Arsenic	57	1.2		2.6		2.5	D	J	1.6		2.9		12.7	D	J	1.9		5.7		13.7	D	3		2.6		4.26	D			
Cadmium	5.1	0.2	U	0.2	U	0.03	D	J	0.2	U	0.2	U	0.19	D	J	0.2		0.3	U	0.29	D	0.2		0.2	U	0.06	D	J		
Chromium	260	17.9		24.5	J	15	B	D	15.9		19.1	J	26.5	B	D	16.6		23.2		30.3	B	J	17.2		15.7		16.9	B	D	J
Copper	390	12.4		15.7		12	D		11.5		14.4	J	41.2	D		17.9		26.7		58.1	B	D	13.4		14		20.8	B	D	
Lead	450	2	U	2		2.14	D	J	2	U	4		14.1	D		2	U	7		22.2	B	D	2	U	3		4.07	B	D	
Mercury	0.41	0.03	U	0.02	U	0.012	J	J	0.02	U	0.02	U	0.125	J	0.02	U	0.08		0.207	J	0.02	U	0.02	U	0.0556	J				
Silver	6.1	0.3	U	0.3	U	0.04	D	J	0.3	U	0.4	U	0.18	D	J	0.3	U	0.4	U	0.29	D	J	0.3	U	0.3	U	0.05	D	J	
Zinc	410	28		32		33.9	D		25		33		105	D		29		50		115	B	D	26		32		39.4	B	D	
Non-ionizable Organic Compounds																														
Aromatic Hydrocarbons (µg/kg)																														
Total LPAHs	5,200	20	U	19	U	5.9	U		18	U	5.7	J	68.6	J		19	U	42	J	145.6	J	19	U	19.4	J	11	J			
Naphthalene	2,100	20	U	19	U	5.2	U		18	U	19	U	6.6	J		19	U	20	U	12.6	J	19	U	18	U	5.1	U			
Acenaphthylene	1,300	20	U	19	U	4.7	U		18	U	19	U	4.8	U		19	U	20	U	8.8	J	19	U	18	U	4.6	U			
Acenaphthene	500	20	U	19	U	5.1	U		18	U	19	U	5.1	U		19	U	20	U	6.9	J	19	U	18	U	5	U			
Fluorene	540	20	U	19	U	4.9	U		18	U	19	U	5	U		19	U	20	U	12.9	J	19	U	18	U	4.8	U			
Phenanthrene	1,500	20	U	19	U	4.7	U		18	U	5.7	J	50.4			19	U	28		67.4		19	U	13	J	11	J			
Anthracene	960	20	U	19	U	5.9	U		18	U	19	U	11.6	J		19	U	14	J	37		19	U	6.4	J	5.8	U			
2-MethylNaphthalene	670	20	U	19	U	5.6	U		18	U	19	U	7.4	J		19	U	20	U	11.1	J	19	U	18	U	5.5	U			
Total HPAHs	12,000	39	U	38	U	36.5	J		37	U	107.6	J	599.3	J		38	U	345.6	J	1047.6	J	38	U	77.1	J	134.5	J			
Fluoranthene	1,700	20	U	19	U	9.8	J		18	U	46	J	116	Q	J	19	U	81		191	Q	J	19	U	15	J	26.5			
Pyrene	2,600	20	U	19	U	8.4	J		18	U	42	J	96.2			19	U	69		188		19	U	14	J	21.2				
Benz[a]anthracene	1,300	20	U	19																										

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS^{1,2}

Post-Construction Surface Sediment Monitoring—Year 3
 Duwamish Sediment Other Area and Southwest Bank
 Corrective Measure and Habitat Project
 Boeing Plant 2
 Seattle/Tukwila, Washington

Sampling Area		In-water Work Area Samples Above -5 feet MLLW and Below +4 feet MLLW										In-water Dredging Area Samples Below -5 feet MLLW																
Location		SD-PCM008					SD-PCM009					SD-PCM010					SD-PCM011											
Monitoring Year	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	SD-PCM008					SD-PCM009					SD-PCM010					SD-PCM011									
	2/24/2015	3/10/2016	3/20/2018	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)							
Collection Date	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33							
Sample Depth (ft)	SD-PCM00815	SD-PCM00816	SD-PCM00818	SP-PCM00915	SD-PCM00916	SD-PCM00918	SD-PCM01015	SD-PCM01016	SD-PCM01018	SD-PCM01115	SD-PCM01116	SD-PCM01118	SD-PCM01115	SD-PCM01116	SD-PCM01118	SD-PCM01115	SD-PCM01116	SD-PCM01118	SD-PCM01115	SD-PCM01116	SD-PCM01118							
Analyte	SMS SQS Criteria ³	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2						
Non-ionizable Organic Compounds (cont.)																												
Miscellaneous (µg/kg)																												
Dibenzofuran	540	20	U		19	U		4.6	U		18	U		19	U	UJ	4.6	U		19	U		18	U		4.5	U	
Hexachlorobutadiene	11	4.9	U		4.7	U		0.7	U		4.6	U		4.7	U	UJ	0.7	U		4.8	U		5	U		0.7	U	UJ
N-nitrosodiphenylamine	28	4.9	U		4.7	U		1.3	U		4.6	U		4.7	U	UJ	1.3	U		4.8	U		5	U		1.3	U	
Ionizable Organic Compounds (µg/kg)																												
Phenol	420	20	U	UJ	19	U		8.2	U		18	U		19	U	J	26.7			19	U	UJ	20	U		17.7	J	
2-Methylphenol	63	4.9	U	UJ	4.7	U		1.1	U		4.6	U		4.7	U	UJ	1.1	U		4.8	U	UJ	5	U	UJ	1.1	U	
4-Methylphenol	670	20	U	UJ	19	U		14.6	U		18	U		19	U	UJ	14.7	U		19	U	UJ	20	U		14.4	U	
2,4-Dimethylphenol	29	24	U	UJ	24	U		2.2	U		23	U		24	U	UJ	2.2	U		24	U	UJ	25	U		2.1	U	
Pentachlorophenol	360	20	U	UJ	19	U		31.1	U		18	U		19	U	UJ	31.3	U		19	U	UJ	20	U		30.7	U	
Benzyl alcohol	57	20	U	UJ	19	U		14.8	U		18	U		19	U	UJ	38			19	U	UJ	20	U		65.6		
Benzoic acid	650	200	U	UJ	190	U		398	U	UJ	180	U		190	Q	J	295	J		190	U	UJ	85	J		171	J	J
PCBs (µg/kg)																												
Aroclor 1016	NE	3.9	U		3.8	U		1.6	U		3.9	U		3.8	U		1.5	U		3.8	U		3.9	U		1.6	U	
Aroclor 1221	NE	3.9	U		3.8	U		1.6	U		3.9	U		3.8	U		1.5	U		3.8	U		3.9	U		1.6	U	
Aroclor 1232	NE	3.9	U		3.8	U		1.6	U		3.9	U		3.8	U		1.5	U		3.8	U		3.9	U		1.6	U	
Aroclor 1242	NE	3.9	U		3.8	U		1.6	U		3.9	U		3.8	U		1.5	U		3.8	U		3.9	U		1.6	U	
Aroclor 1248	NE	3.9	U		3.8	U		1.6	U		3.9	U		3.8	U		14.5			3.8	U		14			27.2		
Aroclor 1254	NE	3.9	U		3.8	U		2	J		3.9	U		4.6			21.5			3.8	U		21			44.5		
Aroclor 1260	NE	3.9	U		3.8	U		0.6	U		3.9	U		2.7	J		15.5			3.8	U		11			41.2		
Total PCBs (µg/kg Dry-Weight)	130	3.9	U		3.8	U		2	J	J ⁵	3.9	U		7.3	J	J ⁵	51.5			3.8	U		46			112.9		
Total PCBs (mg/kg OC) ⁴	12	—		—	—		—	—		—	—		—	—		2.3	J ⁶	—	—	2.4	J ⁶	—	—	—	3.6	J ⁶	3.2	J ⁶

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS^{1,2}

Post-Construction Surface Sediment Monitoring—Year 3
 Duwamish Sediment Other Area and Southwest Bank
 Corrective Measure and Habitat Project
 Boeing Plant 2
 Seattle/Tukwila, Washington

Sampling Area	Location	Outfall Samples																										
		SD-PCM025						SD-PCM026						SD-PCM027						SD-PCM028								
Monitoring Year	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)										
	3/11/2015	3/9/2016	3/19/2018	3/10/2015	3/10/2016	3/19/2018	2/25/2015	3/11/2016	3/20/2018	2/24/2015	3/11/2016	3/20/2018	2/24/2015	3/11/2016	3/20/2018	2/24/2015	3/11/2016	3/20/2018										
Collection Date	0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33		0 - 0.33											
	SD-PCM02515	SD-PCM02516	SD-PCM02518	SD-PCM02615	SD-PCM02616	SD-PCM02618	SD-PCM02715	SD-PCM02716	SD-PCM02718	SD-PCM02815	SD-PCM02816	SD-PCM02818	SD-PCM02815	SD-PCM02816	SD-PCM02818	SD-PCM02815	SD-PCM02816	SD-PCM02818										
Analyte	SMS SQS Criteria ³	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2									
Conventionals																												
Total Organic Carbon(percent)	—	0.054		0.985	J	0.47	J	0.058		0.06	J	0.08	J	0.072		0.057	J	0.7	J	0.036		0.041	J	2.57	J			
Metals (mg/kg)																												
Arsenic	57	1.8		2.8		3.28	D	1.7		2.1		2.01	D	1.4	J	2.1		6.09	D	J	2.1		2.1		11.9	D	J	
Cadmium	5.1	0.2	U	0.2	U	0.05	D	0.2		0.2	U	0.05	D	0.2	U	0.2	U	0.11	D	J	0.2	U	0.2	U	0.28	D		
Chromium	260	14.5		16.6		16.4	B	19.7		17	J	21.9	B	15.9		15	J	21	B	D	18.4		15.2	J	27.1	B	D	
Copper	390	11.7		15.8		19.8	B	17.6		13.5		11	B	11.1		15.7	J	26.3	D		12.3		15.1	J	49.2	D		
Lead	450	2	U	3		2.89	B	2	U	2	U	2.86	B	2	U	2		6.08	D		2	U	2	U	18.8	D		
Mercury	0.41	0.03	U	0.02	U	0.579	J	0.04		0.02	U	0.00169	U	0.02	U	0.02	U	0.0708	J	0.02	U	0.02	U	0.212	J			
Silver	6.1	0.3	U	0.3	U	0.05	D	0.3	U	0.3	U	0.03	D	0.3	U	0.3	U	0.09	D	J	0.3	U	0.3	U	0.23	D	J	
Zinc	410	25		35		37.2	B	28		28		29.7	B	25		26		64.5	D		26		29		117	D		
Non-ionizable Organic Compounds																												
Aromatic Hydrocarbons (µg/kg)																												
Total LPAHs	5,200	19	U	15	J	8.2	J	20	U	20	U	5.9	U	19	U	20	U	22	J		19	U	20	U	87.2	J		
Naphthalene	2,100	19	U	19	U	5.1	U	20	U	20	U	5.2	U	19	U	20	U	5.1	U		19	U	20	U	8.7	J		
Acenaphthylene	1,300	19	U	19	U	4.6	U	20	U	20	U	4.7	U	19	U	20	U	4.6	U		19	U	20	U	5.5	J		
Acenaphthene	500	19	U	19	U	5	U	20	U	20	U	5.1	U	19	U	20	U	5	U		19	U	20	U	5.1	U		
Fluorene	540	19	U	19	U	4.8	U	20	U	20	U	4.9	U	19	U	20	U	4.8	U		19	U	20	U	6	J		
Phenanthrene	1,500	19	U	15	J	8.2	J	20	U	20	U	4.7	U	19	U	20	U	15.5	J		19	U	20	U	49.3			
Anthracene	960	19	U	19	U	5.8	U	20	U	20	U	5.9	U	19	U	20	U	6.5	J		19	U	20	U	17.7	J		
2-MethylNaphthalene	670	19	U	19	U	5.5	U	20	U	20	U	5.6	U	19	U	20	U	5.5	U		19	U	20	U	8	J		
Total HPAHs	12,000	38	U	89.1	J	143	J	4.3	J	39	U	10.1	U	12	J	39	U	245.8	J		37	U	40	U	680.9	J		
Fluoranthene	1,700	19	U	24		36.7	Q	J	20	U	20	U	4.5	U	19	U	20	U	44.2			19	U	20	U	120		
Pyrene	2,600	19	U	21		14.7	J	20	U	20	U	5.5	U	19	U	20	U	40.6			19	U	20	U	110			
Benz[a]anthracene	1,300	19	U	6.6	J	19.5		20	U	20	U	5.1	U	19	U	20	U	18.2	J		19	U	20	U	54.4			
Chrysene	1,400	19	U	10	J	13.7	J	20	U	20	U	5.2	U	19	U	20	U	30.1			19	U	20	U	82.2			
Total benzofluoranthenes	3,200	38	U	20	J	29.9	J	39	U	39	U	10.1	U	39	U	39	U	60.8			37	U	40	U	174			
Benzo[a]pyrene	1,600	19	U	7.5	J	11	J	20	U	20	U	6.4	U	19	U	20	U	21			19	U	20	U	62.2			
Indeno[1,2,3-c,d]pyrene	600	19	U	19	U	8.2	J	20	U	20	U	5.9	U	19	U	20	U	13.4	J		19	U	20	U	33	</		

TABLE 2

SEDIMENT MANAGEMENT STANDARDS CHEMICALS OF CONCERN ANALYTICAL RESULTS^{1,2}

Post-Construction Surface Sediment Monitoring—Year 3
 Duwamish Sediment Other Area and Southwest Bank
 Corrective Measure and Habitat Project
 Boeing Plant 2
 Seattle/Tukwila, Washington

Sampling Area		Outfall Samples																									
		SD-PCM025						SD-PCM026						SD-PCM027						SD-PCM028							
Location	Monitoring Year	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)	Year 0 (2015)	Year 1 (2016)	Year 3 (2018)					
		3/11/2015	3/9/2016	3/19/2018	3/10/2015	3/10/2016	3/19/2018	2/25/2015	3/11/2016	3/20/2018	2/24/2015	3/11/2016	3/20/2018	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33					
Collection Date	Sample Depth (ft)	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33	0 - 0.33					
Sample ID	SD-PCM02515	SD-PCM02516	SD-PCM02518	SD-PCM02615	SD-PCM02616	SD-PCM02618	SD-PCM02715	SD-PCM02716	SD-PCM02718	SD-PCM02815	SD-PCM02816	SD-PCM02818															
Analyte	SMS SQS Criteria ³	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2	Value	Q1	Q2		
Non-ionizable Organic Compounds (cont.)																											
Miscellaneous (µg/kg)																											
Dibenzofuran	540	19	U		19	U		4.5	U		20	U		20	U		4.6	U		19	U		20	U		6.5	J
Hexachlorobutadiene	11	4.7	U		4.7	U		0.7	U	UJ	3	J		4.9	U		0.7	U	UJ	4.8	U		4.9	U		0.7	U
N-nitrosodiphenylamine	28	4.7	U		4.7	U		1.3	U	UJ	4.9	U		4.9	U		1.3	U		4.8	U		4.9	U		1.3	U
Ionizable Organic Compounds (µg/kg)																											
Phenol	420	19	U	UU	19	U		19.6	U		9.8	J		18	J		8.2	U		19	U		9.8	J		10.6	J
2-Methylphenol	63	4.7	U	UU	4.7	U	UU	1.1	U	UU	4.9	U		4.9	U		1.1	U		4.8	U		4.9	U		1.1	U
4-Methylphenol	670	19	U	UU	19	U		19.6	U		20	U		20	U		14.6	U		19	U		20	U		14.6	U
2,4-Dimethylphenol	29	23	U	UU	23	U		2.1	U	UU	25	U		25	U		2.2	U		24	U		25	U		2.1	U
Pentachlorophenol	360	19	U	UU	19	U	UU	98	U		20	U		20	U		31.1	U	UU	19	U		20	U	UU	30.2	U
Benzyl alcohol	57	19	U	UU	19	U		19.6	U		20	U		20	U		14.8	U		19	U		20	U		14.4	U
Benzoic acid	650	190	U	UU	190	U		196	U		200	U		200	U		398	U	UU	190	U		200	U		190	U
PCBs (µg/kg)																											
Aroclor 1016	NE	3.7	U		3.8	U		1.5	U		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		1.6	U
Aroclor 1221	NE	3.7	U		3.8	U		1.5	U		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		1.6	U
Aroclor 1232	NE	3.7	U		3.8	U		1.5	U		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		1.6	U
Aroclor 1242	NE	3.7	U		3.8	U		1.5	U		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		1.6	U
Aroclor 1248	NE	3.7	U		3.8	U		2.6	J		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		9.3	
Aroclor 1254	NE	3.7	U		6.7			3.4	J		3.9	U		3.9	U		1.5	U		3.8	U		3.9	U		45.9	
Aroclor 1260	NE	3.7	U		2.2	J		2.4	J		3.9	U		2.9	J		5			3.8	U		3.9	U		12.2	
Total PCBs (µg/kg Dry-Weight)	130	3.7	U		8.9	J	J ⁵	8.4	J	J ⁵	3.9	U		2.9	J	J ⁵	5			3.8	U		39	Y	UY	31.4	
Total PCBs (mg/kg OC) ⁴	12	—			0.9	J ⁶	—	—	—	—	—	—	—	—	—	—	—	—	4.5	J ⁶	—	—	—	—	—	4.2	J ⁶